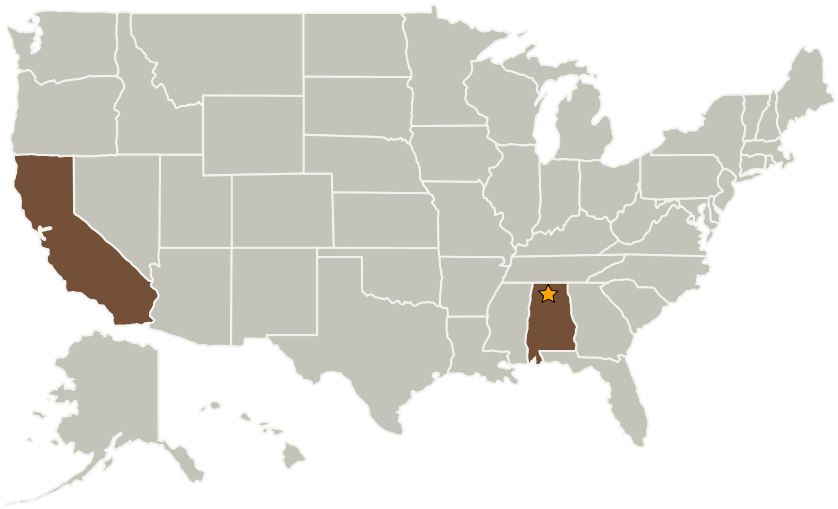
Attached Inflatable Forebody Decelerator for Spacecraft Aerocapture, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

There are two distinct approaches to aerocapture: drag modulation and lift-vector control. All current research under the NASA ROSS In-Space Propulsion Technology Program is based on the drag modulation approach. However, a growing number of researchers are convinced that lift-vector control will be necessary, particularly for the more challenging planetary destinations such as Neptune. Vertigo will research concepts for spacecraft aerocapture using an innovative attached inflatable forebody decelerator that employs lift-vector control. Compared to drag modulation, lift-vector control expands the entry corridor to provide the needed margin for the total of the statistical uncertainties associated with navigation and atmospheric property estimation. Because aerocapture uses aerodynamic forces and not propulsion to decelerate, the amount of fuel required for a mission is greatly reduced. During Phase I Vertigo will define a concept for an attached inflatable forebody decelerator that incorporates lift-vector trajectory control. The results of the Phase I research will form the basis for a Phase II program in which we will perform a detailed evaluation of all aspects of the conceptual aerocapture system to converge on a single design concept for multiple aerocapture missions, and completely analyze the characteristics of spacecraft utilizing the selected aerocapture concepts.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Vertigo Inc	Supporting Organization	Industry	Lake Elsinore, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Glen J Brown

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.2 Descent
    - TX09.2.1 Aerodynamic Decelerators